

U.S. DEPARTMENT OF COMMERCE PATENT & TRADEMARK OFFICE

B/O Form PTO-1390		Transmittal Letter to the United States Designated/Elected Office (DO/EO/US) Concerning a Filing Under 35 USC 371		Attorney's Docket Number DEWA3001/JEK
				U.S. Application Number (if known) 10/088206
International Application Number PCT/EP00/08886	International Filing Date 12 September 2000	Priority Date Claimed 16 September 1999		
Title of Invention METHOD AND DEVICE FOR MONITORING THE WEAR OF A RAPIER BAND				
Applicant(s) for DO/EO/US Luc DEWAELE		Assignee		

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items under 35 USC 371:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 USC 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 USC 371.
3. ☒ This express request to begin national examination procedures (35 USC 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 USC 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed 35 USC 371(c)(2).
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 USC 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 USC 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 USC 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 USC 371(c)(4)). (☐ Executed ☒ Unexecuted)
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 USC 371(c)(5)).

Items 11 to 16 below concern other document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information: Application Data Sheet; 2 sheets formal drawings

101388206 15 MAR 2002

Application Number (if Known) 10/088206		International Application Number PCT/EP00/08886		Attorney's Docket Number DEWA3001/JEK	
				Calculations	PTO USE ONLY
17. The following fees are submitted: Basic National Fee (37 CFR 1.492(a)(1)-(5)): <input checked="" type="checkbox"/> Search report has been prepared by the EPO or JPO \$890.00 <input type="checkbox"/> International Preliminary Examination Fee paid to USPTO (37 CFR 1.482) \$710.00 <input type="checkbox"/> No International Preliminary Examination Fee paid to USPTO (37 CFR 1.482) but International Search Fee paid to USPTO (37 CFR 1.445(a)(2)) \$740.00 <input type="checkbox"/> Neither International Preliminary Examination Fee (37 CFR 1.482) nor International Search Fee (37 CFR 1.445(a)(2)) paid to USPTO \$1040.00 <input type="checkbox"/> International Preliminary Examination Fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00					
ENTER APPROPRIATE BASIC FEE AMOUNT				\$ 890.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).					
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total Claims	12 -20 =		× \$18.00		
Independent Claims	1 -3 =		× \$84.00		
Multiple Dependent Claims (if applicable)			+ \$280.00		
TOTAL OF ABOVE CALCULATIONS				\$ 890.00	
Reduction by ½ for filing by small entity, if applicable. Small Entity Status is asserted pursuant to 37 CFR 1.27 for this application.					
SUBTOTAL				\$ 890.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).					
TOTAL NATIONAL FEE				\$ 890.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property.					
TOTAL FEES ENCLOSED				\$ 890.00	
				Refunded:	
				Charged:	

- a. ☒ A check in the amount of \$890.00 to cover the fees is enclosed.
- b. ☐ Please charge my Deposit Account Number 02-0200 in the amount of \$_____ to cover the above fees.
A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account Number 02-0200. A duplicate copy of this sheet is enclosed.

Note: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

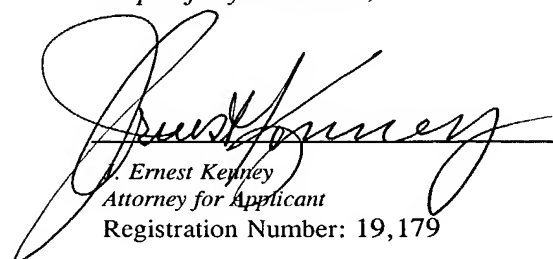


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DATE: 15 March 2002

Respectfully submitted,


 Ernest Kenney
 Attorney for Applicant
 Registration Number: 19,179

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

**International Patent Application
No. PCT/EP00/08886**

PCT/DO/EO/US

International Filing Date: 12 September 2000

Applicant: Luc DEWAELE

For: METHOD AND DEVICE FOR MONITORING THE WEAR OF A RAPIER BAND

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

This paper accompanies documents submitted to establish the U.S. national stage of the above-identified international patent application.

The claims were not amended during the international phase. Before calculation of the filing fee and before examination, please amend the application as follows:

IN THE CLAIMS:

Please amend the original as-filed claims as shown on the appended APPENDIX OF CLAIMS, which includes amended and non-amended claims. Also appended hereto an APPENDIX OF MARKED UP CLAIMS showing the changes which have been made.

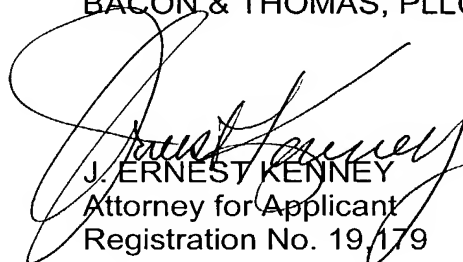
REMARKS

All rights are reserved to the original claimed subject matter. The claims have been amended to reduce the filing fees and to restate the inventive subject matter in clear terms. None of the amendments are intended to narrow any element of the

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Attorney Docket: DEWA3001/JEK

claims as they stood prior to amendment. Examination of the application as amended
is respectfully requested.

Respectfully submitted,
BACON & THOMAS, PLLC


J. ERNEST KENNEY
Attorney for Applicant
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Date: March 15, 2002

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PATENT TRADEMARK OFFICE

International Application No. PCT/EP00/08886
Attorney Docket: DEWA3001/JEK

JC13 Rec'd PCT/PTO 15 MAR 2002

APPENDIX OF CLAIMS

1. A method to monitor the wear of a rapier band (1) of a rapier loom characterized in that the temperature of the rapier band (1) and/or of a component (3, 12) in contact with the rapier band is analyzed as a wear characteristic value of the rapier band (1).
2. Method as claimed in claim 1, characterized in that the temperature of the rapier band (1) is measured directly.
3. Method as claimed in claim 1, characterized in that the temperature of the rapier band (1) is measured indirectly.
- 4(Amended). Method as claimed in either of claim 1, characterized in that the temperature of a component (3, 12) guiding the rapier band (1) is measured.
5. Method as claimed in claim 4, characterized by measuring the temperature of a guide element (3, 12) which maintains the rapier band (1) engaged with a drive wheel (2).
- 6(Amended). Method as claimed in claim 1, characterized by measuring the temperature differential between the first directly or indirectly detected temperature of the rapier band and a second temperature detected at a measuring site different from the site of the first temperature.
7. Device to monitor the wear of a rapier band (1) of a rapier loom, characterized by an analyzer (8) analyzing, as a wear characteristic value of the rapier band (1), the temperature of the rapier band (1) and/or of a component (3, 12) making contact with the rapier band (1).

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8. Device as claimed in claim 7, characterized in that a first temperature sensor (6) directly or indirectly detecting the temperature of the rapier band (1) and a second temperature sensor (7) are connected to the analyzer (8), said second temperature sensor being spaced away from the first temperature sensor.

9. Device as claimed in claim 8, characterized in that the first temperature sensor (6) is associated with a guide element (3, 12) which maintains the rapier band (1) engaged with the drive wheel (2).

10(Amended). Device as claimed in claim 7, characterized in that the guide element (3, 12) includes a thermally conducting support receiving the first temperature sensor (6) at a first site near the rapier band (1) and the second temperature sensor (7) at a site away from the rapier band (1).

11(Amended). Device as claimed in claim 7, characterized in that an input unit (10) to apply a comparison value is associated with the analyzer (8).

12(Amended). Device as claimed in claim 7, characterized in that the analyzer (8) is connected to a display (9) and/or to a control system (11).

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Attorney Docket: DEWA3001/JEK

APPENDIX OF MARKED-UP VERSION OF CLAIMS

4(Amended). Method as claimed in either of claim 1 [or 3], characterized in that the temperature of a component (3, 12) guiding the rapier band (1) is measured.

6(Amended). Method as claimed in [one of claims 1 through 5] claim 1, characterized by measuring the temperature differential between the first directly or indirectly detected temperature of the rapier band and a second temperature detected at a measuring site different from the site of the first temperature.

10(Amended). Device as claimed in [one of claims 7 through 9] claim 7, characterized in that the guide element (3, 12) includes a thermally conducting support receiving the first temperature sensor (6) at a first site near the rapier band (1) and the second temperature sensor (7) at a site away from the rapier band (1).

11(Amended). Device as claimed in [one of claims 7 through 10] claim 7, characterized in that an input unit (10) to apply a comparison value is associated with the analyzer (8).

12(Amended). Device as claimed in [one of claims 7 through 11] claim 7, characterized in that the analyzer (8) is connected to a display (9) and/or to a control system (11).

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METHOD AND DEVICE FOR MONITORING THE WEAR OF A RAPIER BAND

The invention relates to a method and a device to monitor the wear of a rapier band of a rapier loom.

5 It is known from US patent 4,982,767 to detect rapier band wear by fitting a rapier band with elements distributed across the thickness and length of this band. These elements are designed to generate optical, electrical or magnetic signals indicating the wear of the rapier band. However such elements alter the rapier band structure and therefore are not well suited in rapidly operating rapier
10 looms.

It is furthermore known from US patent 5,318,077 to guide the top side of a rapier band only partly in a guide block in the region of the drive wheel. Rapier band wear is determined by measuring the position of the unguided part. This kind of wear monitoring requires that part of the rapier band shall not be guided in the
15 guide block. As a consequence the portion of the rapier band being guided in said guide block is exposed to greater wear.

The objective of the present invention is to create a method and device to monitor rapier band wear that shall be independent of specific rapier band design and/or of the guide elements.

20 This problem is solved by analyzing the temperature of the rapier band and/or of a component in contact with this rapier band as a characteristic value of rapier band wear.

It is the inventors' discovery that the temperature of a rapier band and also that of a component in contact with this rapier band shall change during operation
25 as a function of this rapier band's wear. This effect is exploited to ascertain the rapier band's wear status by means of the temperature of the rapier band and/or of a component in contact with it. This monitoring method is practically independent of the configurations both of the rapier band and of the guide elements. As a consequence, the structure of the rapier band and the shape of
30 the guide elements guiding the rapier band may be optimally designed to

accurately guide the rapier band because that particular time can be very accurately detected at which the rapier band has worn so much that the desired operation no longer can be reliably expected.

In a first embodiment of the present invention, the rapier band temperature is measured directly. Illustratively such a measurement may be carried out by an infrared detector mounted at an appropriate site. Practically however it will be adequate enough to indirectly measure the rapier band temperature. Advantageously in this case, the temperature of a component guiding the rapier band shall be measured.

10 In a further embodiment of the invention, the temperature differential between the rapier band temperature detected directly or indirectly and the temperature detected at a measurement site a distance away will be analyzed. As a result the ambient temperature factor shall be eliminated.

The basic task of the invention is solved using a device comprising an analyzer analyzing the temperature of the rapier band and/or of a component in contact with it as a characteristic value of this rapier band's wear.

Advantageously and in a further embodiment of the invention, a first temperature sensor detects the temperature in the immediate vicinity of the rapier band and a second temperature sensor connected to the analyzer detects the temperature at a site a distance away from the first sensor while being connected to the analyzer.

As regards a preferred embodiment, the first temperature sensor is associated with a guide block keeping the rapier band in contact with a drive wheel. This region is outside the shed and therefore easily accessed. Advantageously a thermally conducting element shall be mounted on the guide block and the first temperature sensor is affixed to an element side facing the guide block and the second temperature sensor at a side away from said block. The temperature sensors are mounted in shielded manner inside the element and therefore are very unlikely to suffer damage.

30 In a further embodiment of the invention, an input unit to feed a comparison value to the analyzer is associated with this analyzer. The operator may enter

through this input unit a value that shall be compared by the comparator with the detected temperature or with the monitored temperature time function, so that, when said value shall be reached, the rapier band wear shall be such that an exchange should be implemented.

5 In a further embodiment of the invention, the analyzer is connected to a display showing the wear status of the rapier band. Accordingly the operator is able to see or his attention may be attracted when the rapier band must be exchanged in order to assure continued optimal weaving.

Further features and advantages of the invention are elucidated in the following description of an illustrative embodiment shown in the drawings.

Fig. 1 is a rapier-loom cutaway view with a drive wheel and equipment to monitor rapier band wear,

Fig. 2 shows a section along line II-II of Fig. 1, and

Fig. 3 shows a partial section similar to Fig. 1 of an embodiment variation.

15 The portion of a rapier loom shown in Fig. 1 contains a rapier band 1 which in a manner not further shown is fitted with a rapier used to insert fillings into a shed of the rapier loom. The rapier band 1 is driven by a rocking drive wheel 2. As shown in Fig. 2, the rapier band 1 is regularly perforated and the teeth of the drive wheel 2 enter these perforations. Planar guide elements 3, 4 maintain the rapier band 1 against the periphery of the drive wheel 2 so that the teeth of the latter stay engaged with the perforations of the rapier band 1. The planar guide elements 3, 4 are configured substantially tangentially to the drive wheel 2. Said elements are mounted on supports 5, 13 which in turn are affixed by fasteners (not shown) to the rapier loom's framework.

25 A first temperature sensor 6 is mounted in the support 5 in the zone where the rapier band 1 is deflected from the horizontal direction into the circumferential direction of the drive wheel 2. The temperature sensor 6 is mounted in the vicinity of the guide element 3 in order to detect the temperature of latter and indirectly thereby also that of the rapier band 1.

30 A second temperature sensor 7 is used to eliminate the ambient temperature factor. It too is mounted in the support 5, however at a site less

signals may be transmitted directly from the analyzer 8 to an optical or acoustic display 9.

Preferably the wear of the rapier band shall be monitored by analyzing the differential of the temperatures measured by the sensors 6 and 7. For example, 5 the temperature differential may be monitored with respect to exceeding a predetermined value that is fed from an input unit 10 to the analyzer 8. This feature is advantageous because thereby ambient factors can be eliminated, for instance a temperature rise in the weaving room. The measured temperature differential substantially relies only on higher wear-caused friction between the 10 rapier band 1 and the guide element 3. Therefore, regardless of the ambient temperature, this differential is indicative of the temperature of the rapier band 1 and/or of the guide element 3. Even though the temperature sensors 6 and 7 are located in the same support, they will measure different temperatures. The temperature measured by the sensor 6 essentially depends on the friction between 15 the rapier band 1 and the guide element 3 because it is located in the immediate vicinity of that location where the frictional heat is being generated. On the other hand the temperature sensor 7 is configured at a site of the support 5 where the heat has already been substantially dissipated into ambient.

As regards the embodiment of Fig. 3, the guide element for the rapier band 20 1 is a guide block 12 wherein the first and second temperature sensors 6 and 7 connected to the analyzer 8 are configured in the manner of the embodiment of Figs. 1 and 2. Obviously the temperature sensors also may be configured in another way, for instance at the guide support 13 or at a guide support 14 located a distance away from the drive wheel 2.

25 It was found that for a new rapier band 1, the temperature measured by the sensor 6 and the temperature differential between the sensors 6 and 7 will be comparatively high. Following a run-in phase of several hours for the rapier band, the temperature or the temperature differential will decrease and assume an operational value. The temperature or the temperature differential however 30 increase again as the rapier band wear increases. As a rule the critical value of

wear for the known rapier bands materializes following 10,000 hours or more of operation.

Furthermore the wear of a rapier band 1 also may be monitored by means of the change in time of the temperature or temperature differential. Again this change in temperature or temperature differential may be analyzed when starting a previously shutdown loom, that is, by observing how fast the temperature or the temperature differential will rise following loom start.

The invention makes it possible to substantially accurately determine when a rapier band must be replaced. As a result the rapier band may be used as long as intrinsically feasible. This feature furthermore is advantageous over the procedure whereby every rapier band must be replaced following a given time of operation. The invention allows detecting in due time a prematurely worn rapier band and to prevent its rupture. Again a rapier band that incurs less wear than typical may be used for longer operational times than prescribed by scheduled replacements.

The invention is not restricted to the above illustrative embodiments. In particular the temperature or the temperature differential may be measured in ways that are different from above, for instance at other sites or using different sensors, such as infrared detectors. The scope of protection of the present
20 invention is solely defined by the attached claims.

CLAIMS

1. A method to monitor the wear of a rapier band (1) of a rapier loom characterized in that the temperature of the rapier band (1) and/or of a component (3, 12) in contact with the rapier band is analyzed as a wear characteristic value of the rapier band (1).
2. Method as claimed in claim 1, characterized in that the temperature of the rapier band (1) is measured directly.
3. Method as claimed in claim 1, characterized in that the temperature of the rapier band (1) is measured indirectly.
4. Method as claimed in either of claim 1 or 3, characterized in that the temperature of a component (3, 12) guiding the rapier band (1) is measured.
5. Method as claimed in claim 4, characterized by measuring the temperature of a guide element (3, 12) which maintains the rapier band (1) engaged with a drive wheel (2).
6. Method as claimed in one of claims 1 through 5, characterized by measuring the temperature differential between the first directly or indirectly detected temperature of the rapier band and a second temperature detected at a measuring site different from the site of the first temperature.
7. Device to monitor the wear of a rapier band (1) of a rapier loom, characterized by an analyzer (8) analyzing, as a wear characteristic value of the rapier band (1), the temperature of the rapier band (1) and/or of a component (3, 12) making contact with the rapier band (1).

8. Device as claimed in claim 7, characterized in that a first temperature sensor (6) directly or indirectly detecting the temperature of the rapier band (1) and a second temperature sensor (7) are connected to the analyzer (8), said second temperature sensor being spaced away from the first temperature sensor.

9. Device as claimed in claim 8, characterized in that the first temperature sensor (6) is associated with a guide element (3, 12) which maintains the rapier band (1) engaged with the drive wheel (2).

10. Device as claimed in one of claims 7 through 9, characterized in that the guide element (3, 12) includes a thermally conducting support receiving the first temperature sensor (6) at a first site near the rapier band (1) and the second temperature sensor (7) at a site away from the rapier band (1).

11. Device as claimed in one of claims 7 through 10, characterized in that an input unit (10) to apply a comparison value is associated with the analyzer (8).

12. Device as claimed in one of claims 7 through 11, characterized in that the analyzer (8) is connected to a display (9) and/or to a control system (11).

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES
PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

(19) Weltorganisation für geistiges Eigentum
Internationales Büro



(43) Internationales Veröffentlichungsdatum
22. März 2001 (22.03.2001)

PCT

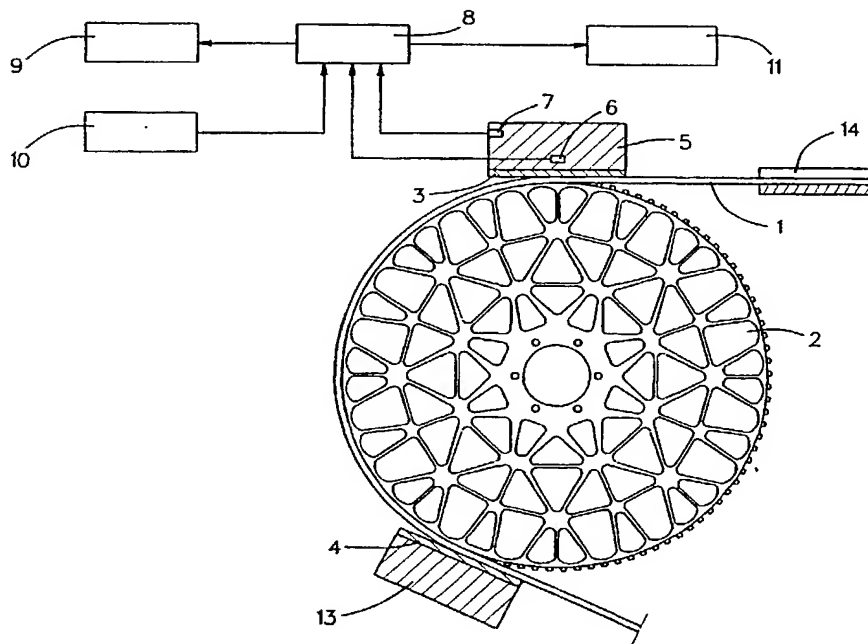
(10) Internationale Veröffentlichungsnummer
WO 01/20066 A1

- (51) Internationale Patentklassifikation⁷: D03D 47/12, 47/27
- (21) Internationales Aktenzeichen: PCT/EP00/08886
- (22) Internationales Anmeldedatum:
12. September 2000 (12.09.2000)
- (25) Einreichungssprache: Deutsch
- (26) Veröffentlichungssprache: Deutsch
- (30) Angaben zur Priorität:
9900620 16. September 1999 (16.09.1999) BE
- (71) Anmelder (für alle Bestimmungsstaaten mit Ausnahme von US): PIKANOL N.V. [BE/BE]; Polenlaan 3-7, B-8900 Ieper (BE).
- (72) Erfinder; und
- (75) Erfinder/Anmelder (nur für US): DEWAELE, Luc [BE/BE]; Gen. Baron Jacquesstraat 58, B-8600 Diksmuide (BE).
- (74) Anwalt: DAUSTER, Hanjörg; Wilhelm & Dauster, Hospitalstrasse 8, 70174 Stuttgart (DE).
- (81) Bestimmungsstaaten (national): CN, JP, KR, US.
- (84) Bestimmungsstaaten (regional): europäisches Patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).
- Veröffentlicht:
— Mit internationalem Recherchenbericht.

[Fortsetzung auf der nächsten Seite]

(54) Title: METHOD AND DEVICE FOR MONITORING THE WEAR OF A RAPIER BAND

(54) Bezeichnung: VERFAHREN UND VORRICHTUNG ZUM ÜBERWACHEN DER ABNUTZUNG EINES GREIFERBANDDES



(57) Abstract: The aim of the invention is to monitor the wear of a rapier band (1) of a rapier loom. To this end, the temperature of the rapier band (1) and/or the temperature of a component being in contact with the rapier band is evaluated as a characteristic value of the wear of the rapier band.

[Fortsetzung auf der nächsten Seite]

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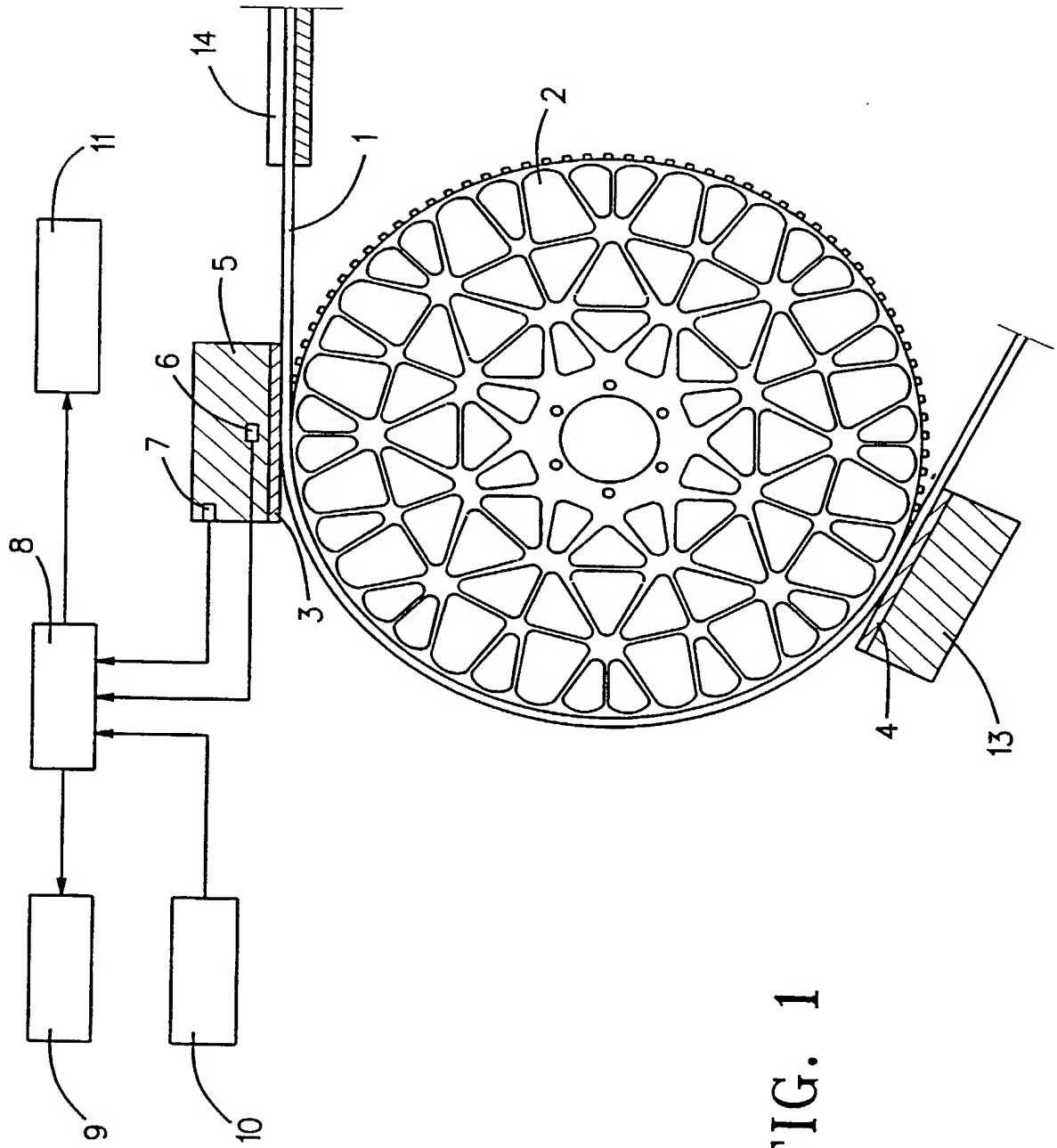


FIG. 1

FIG. 2

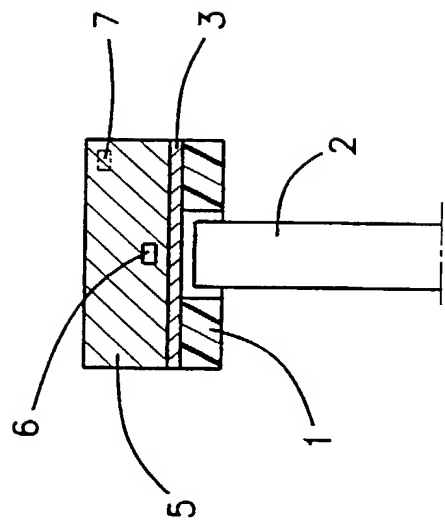
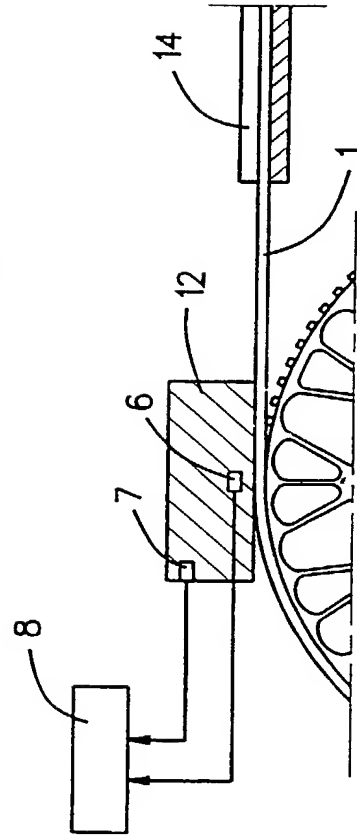


FIG. 3



ATTORNEY/DOCKET NO DEWA3001/JEK

DECLARATION FOR PATENT APPLICATION AND APPOINTMENT OF ATTORNEY

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name; I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention (Design, if applicable) entitled: **METHOD AND DEVICE FOR MONITORING THE WEAR OF A RAPIER BAND** the specification of which (check one):

☐ is attached hereto, or ☒ was filed on: **12 September 2000**

as U.S. Application Number or PCT

International Application Number: **(PCT/EP00/08886) 10/088,206**

and (if applicable) was amended on:

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above. I acknowledge the duty to disclose information which is material to patentability as defined in *Title 37, Code of Federal Regulations, §1.56*. I hereby claim foreign priority benefits under *Title 35, United States Code §119* of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

PRIOR FOREIGN APPLICATION(S)			PRIORITY CLAIMED	
Number	Country	Day/Month/Year Filed	Yes	No
9900620	Belgium	16 September 1999	X	

☐ Additional Priority Application(s) Listed on Following Page(s)

I HEREBY CLAIM THE BENEFIT UNDER TITLE 35 U.S. CODE §119(E) OF ANY U.S. PROVISIONAL APPLICATIONS LISTED BELOW.	
Application Number	Day/Month/Year Filed

☐ Additional Provisional Application(s) Listed on Following Page(s)

I hereby claim the benefit under *Title 35, United States Code, §120* of any United States application(s) or PCT international application(s) designating The United States of America listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of *Title 35, United States Code, §112*, I acknowledge the duty to disclose information which is material to patentability as defined in *Title 37, Code of Federal Regulations, §1.56* which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:

Application Number	Filing Date	Status - Patented, Pending or Abandoned

☐ Additional US/PCT Priority Application(s) listed on Following Page(s)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under *section 1001 of title 18 of the United States Code* and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: I (We) hereby appoint as my (our) attorneys, with full powers of substitution and revocation, to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: J. Ernest Kenney, Reg. No. 19,179; Eugene Mar, Reg. No. 25,893; Richard E. Fichter, Reg. No. 26,382; Thomas J. Moore, Reg. No. 28,974; Joseph DeBenedictis, Reg. No. 28,502; Benjamin E. Urcia, Reg. No. 33,805; and

I (we) authorize my(our) attorneys to accept and follow instructions from Ruff Wilhelm Beier Dauster & Partner regarding any matter related to the preparation, examination, grant and maintenance of this application, any continuation, continuation-in-part or divisional based thereon, and any patent resulting therefrom, until I (we) or my(our) assigns withdraw this authorization in writing.

Send correspondence to:



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DATE X 9 MAY 2002	SIGNATURE X		

☐ See following page(s) for additional joint inventors.